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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/593,812	09/22/2006	Kouji Nishikawa	296483US0PCT	5609

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EXAMINER	
EOFF, ANCA	

ART UNIT	PAPER NUMBER
1795	

NOTIFICATION DATE	DELIVERY MODE
02/26/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/593,812	NISHIKAWA ET AL.	
	Examiner	Art Unit	
	ANCA EOFF	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 November 2008*.

2a)☒ This action is FINAL. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *23-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *23-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 23-32 are pending. Claims 1-22 have been canceled.

2. The foreign priority document JP 2004-087520 filed on March 24, 2004 was received and acknowledged. However, in order to benefit of the earlier filing date, a certified English translation is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 23-25 and 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamada et al. (US Pg-Pub 2004/0033438).

With regard 23, Hamada et al. disclose a positive-working chemically amplified radiation sensitive resin composition which comprises an alkali-insoluble or slightly alkali-soluble resin (A) protected with an acid-labile protecting group and made alkali-soluble by cleavage of said acid-labile protecting group and compounds generating an acid irradiation with radiation (B) and (C) (par.0013).The composition further comprises a solvent (par.0030).

The resin (A) may be a obtained by copolymerizing 4-, 3- or 2-hydroxystyrene protected by the protecting group with another monomer or monomers (par.0017), wherein the other monomers include acrylic esters and their derivatives, methacrylic

esters and their derivatives (par.0018), isopropenylphenol (par.0019), N-(4-hydroxyphenyl)(meth)acrylamide, N-(3-hydroxyphenyl) (meth)acrylamide, N-(2-hydroxyphenyl)(meth)acrylamide, N-(4-hydroxybenzyl)(meth)acrylamide, N-(3-hydroxybenzyl)(meth)acrylamide, N-(2-hydroxybenzyl)(meth)acrylamide (par.0019).

Hamada et al. do not give specific examples of acrylic esters or methacrylic esters used as "other monomers" but the polymer of formula (I) in par.0022 clearly shows t-butyl (meth)acrylate used as "other monomer".

While Hamada et al. do not specifically disclose a copolymer comprising units of isopropenyphenol, t-butyl (meth)acrylate and an unit of N-(4-hydroxyphenyl)(meth)acrylamide, N-(3-hydroxyphenyl) (meth)acrylamide, N-(2-hydroxyphenyl)(meth)acrylamide, N-(4-hydroxybenzyl)(meth)acrylamide, N-(3-hydroxybenzyl)(meth)acrylamide or N-(2-hydroxybenzyl)(meth)acrylamide, it would have been obvious to one of ordinary skill in the art at the time of the invention to obtain such a copolymer, based on Hamada's teachings that one or more "other monomers" can be copolymerized with protected hydroxystyrene and such "other monomers" include the derivatives listed above (par.0017-0022).

N-(4-hydroxyphenyl)(meth)acrylamide, N(3-hydroxyphenyl) (meth)acrylamide and N-(2-hydroxyphenyl)(meth)acrylamide are equivalent to the unit (1) of the instant application, wherein R_1 is a hydrogen atom or a methyl group, n=0 and m=0.

N-(4-hydroxybenzyl)(meth)acrylamide, N-(3-hydroxybenzyl)(meth)acrylamide and N-(2-hydroxybenzyl)(meth)acrylamide are equivalent to the unit (1) of the instant application, wherein R_1 is a hydrogen atom or a methyl group, n=1 and m=0.

Tert-butyl (meth)acrylate is equivalent to the unit (3) of the instant application, wherein R_4 is a hydrogen atom or methyl group and R_5-R_7 are methyl groups.

Claims 24 and 25 refer only to the intended use of the composition of claim 23 and such intended use adds no patentable weight to the claim. Therefore, the composition of Hamada et al. meets the limitations of claims 24-25 of the instant application.

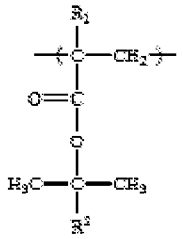
With regard to claim 28, Hamada et al. disclose that the composition may comprise a basic compound, said basic compound controlling the diffusion of an acid generated from an acid generator upon exposure to light (par.0029).

With regard to claim 29, Hamada et al. disclose that the acid generator (C) may be a 4-t-butylphenyl diphenylsulfonium trifluoromethanesulfonate (par.0027).

5. Claims 23-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohta et al. (US Pg-Pub 2004/0038148) in view of Aoai et al. (US Patent 6,245,485).

With regard to claim 23, Ohta et al. disclose a positive type radiation sensitive resin composition, said composition comprising (A) a polymer having an acid-dissociative functional group which is dissociated with an acid to generate an acid functional group and (B) a component which generates an acid when irradiated with radiation (abstract).The composition further comprises a solvent (par.0146-0148).

The resin (A) comprises a monomer (I) represented by the formula (I):



(I) (formula (1) in par.0027), wherein R_1 is a hydrogen atom or a methyl group and R^2 is a monovalent alycyclic group of 6 to 20 carbon atoms which may have a substituent or a monovalent aromatic group of 6 to 20 carbon atoms which may have a substituent (par.0028-0029).

The resin (A) may further comprise other repeating units (monomers (II)), and examples of monomers (II) include amido group-containing vinyl compounds, such as acrylamide and methacrylamide and aromatic vinyl compounds (par.0043), such as isopropenylphenol (par.0039, 0046).

While Ohta et al. do not specifically disclose a polymer comprising a unit of monomer (I) of formula (I) above and units derived from monomers (II), such as isopropenylphenol and acrylamide/methacrylamide, it would have been obvious to one of ordinary skill in the art at the time of the invention to obtain such copolymer, based on Ohta's teachings regarding the monomer (I) and the monomers (II) which can copolymerize with monomer (I) (par.0027-0028, 0037, 0039, 0043).

However, Ohta et al. do not specifically disclose the acrylamide and methacrylamide compounds used as monomers (II) in the resin (A).

Aoai et al. disclose a positive resin composition comprising a compound generating an acid on irradiation of an active light ray or radiation, a resin (abstract).

Aoai et al. teach that the resin comprises a group which decomposes by the action of an acid to increase the solubility in an alkali developer (column 9, lines 35-38). The resin may comprise copolymerizable monomers, such as acrylamides and methacrylamides (column 53, lines 22-27), wherein the acrylamides include N-hydroxyphenyl acrylamide (column 53, lines 59-61) and the methacrylamides include N-hydroxyphenyl methacrylamides (column 54, lines 6-7).

Aoai et al. specifically teach that monomers capable of increasing alkali solubility, such as N-(hydroxyphenyl)acrylamide and N-(hydroxyphenyl)methacrylamide are preferred (column 54, line 61 - column 55, line 2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use N-(hydroxyphenyl)acrylamide and N-(hydroxyphenyl)methacrylamide as comonomers for the resin (A) of Ohta et al., as taught by Aoai et al., in order to improve the solubility of the resin used in a positive type resist composition.

The monomer (I) of formula (I) of Ohta et al. is equivalent to the unit (3) of the instant application.

N-(hydroxyphenyl)acrylamide is equivalent to the unit (1) of the instant application, wherein R_1 is a hydrogen atom, n, m=0.

N-(hydroxyphenyl)methacrylamide is equivalent to the unit (1) of the instant application, wherein R_1 is a methyl group, n, m=0.

Claims 24 and 25 refer only to the intended use of the composition of claim 23 and such intended use adds no patentable weight to the claim. Therefore, the

composition of Ohta modified by Aoai meets the limitations of claims 24-25 of the instant application.

With regard to claim 26, Ohta et al. disclose that the acid generator (B) is comprised in an amount of 0.1 to 20 parts by weight, preferably 0.3 to 10 parts by weight based on 100 parts by weight of the resin (A) (par.0117).

The solvent is comprised in the radiation sensitive composition in an amount preferably between 20 to 60 parts by weight based on 100 parts by weight of positive radiation sensitive composition (par.0149).

With regard to claim 27, Ohta et al. further disclose that the positive-type radiation sensitive composition may further comprise an alkali-soluble resin, other than the resin (A) (par.0126).

With regard to claim 28, Ohta et al. disclose that the positive-type radiation sensitive composition may further comprise an acid diffusion inhibitor, which is preferably a nitrogen-containing organic compound (par.0119-0120).

With regard to claim 29, Ohta et al. disclose that the acid generating agent (B) may be 4-t-butylphenyl diphenylsulfonium trifluoromethanesulfonate, 4-t-butylphenyl diphenylsulfonium perfluro-n-octanesulfonate, 4-t-butylphenyl diphenylsulfonium pyrenesulfonate, 4,7-di-n-butoxynaphthyltetrahydrophenium trifluoromethanesulfonate (par.0115).

With regard to claims 30-31, Ohta et al. disclose that the positive-type radiation sensitive composition can be applied on a support film to form a resin film (par.0151) and the thickness of the resin film can be varied depending upon the use application of

the product formed by plating. In case of a bump, the thickness of the resin film is in the range of 20 to 100 μm (par.0160).

With regard to claim 32, Ohta et al. disclose a process comprising the following steps:

- applying the positive-type radiation sensitive composition onto a substrate having a conductive layer (such as aluminium, copper, silver, gold, palladium and alloys of two or more kinds of these metals, as disclosed in par.0156) on its surface and drying to form a resin film;

- exposing, heating and developing the resin film to obtain a pattern;

- electroplating using the pattern formed on the substrate as a mold;

- removing the resin film portion from the substrate, and

- removing the conductive layer present on the area of the substrate other than the area where the product formed by plating has been formed (par.00153).

Response to Arguments

6. Applicant's arguments filed November 21, 2008 have been fully considered but they are not persuasive.

On page 3 of the Remarks, the applicant argues the rejection of claims 23-25 and 28-29 under 35 USC 103(a) over Hamada et al. (US Pg-Pub 2004/0033438).The applicant argues that Hamada et al. teach a resin having an unit of formula (3) but no units of formula (1), as in the instant application.

The examiner respectfully disagrees and would like to point out to par.0018 and par. 0019, which clearly teaches that the alkali-insoluble resin (A) protected with acid-labile groups may comprise other monomers, such as (meth)acrylic ester and derivatives (par.0018), isopropenylphenol, N-(4-hydroxyphenyl)(meth)acrylamide, N-(3-hydroxyphenyl) (meth)acrylamide, N-(2-hydroxyphenyl)(meth)acrylamide, N-(4-hydroxybenzyl)(meth)acrylamide, N-(3-hydroxybenzyl)(meth)acrylamide, N-(2-hydroxybenzyl)(meth)acrylamide (par.0019).

Hamada et al. do not specifically disclose the (meth)acrylic esters used for the resin (A) but shows a resin comprising t-butyl (meth)acrylate units (formula (I) in par.0022).

While Hamada et al. do not specifically disclose a copolymer comprising units of isopropenyphenol, t-butyl (meth)acrylate and an unit of N-(4-hydroxyphenyl)(meth)acrylamide, N-(3-hydroxyphenyl) (meth)acrylamide, N-(2-hydroxyphenyl)(meth)acrylamide, N-(4-hydroxybenzyl)(meth)acrylamide, N-(3-hydroxybenzyl)(meth)acrylamide or N-(2-hydroxybenzyl)(meth)acrylamide, it would have been obvious to one of ordinary skill in the art at the time of the invention to obtain such a copolymer, based on Hamada's teachings that one or more "other monomers" can be copolymerized with protected hydroxystyrene and such "other monomers" include the derivatives listed above (par.0017-0022).

On page 3 of the Remarks, the applicant further argues that the composition of Hamada et al. does not have good resolution and plating resistance compared to the

composition of the instant application, as shown in the Examples and Comparative Examples of the instant application.

The examiner would like to show the following:

In the Comparative Examples 1-3 and 6 of the instant application, the applicant uses the resin R_1 which is a copolymer comprising 30 mol% p-isopropenylphenol, 20 mol% 2-hydroxyethylacrylate and 50 mol% 2-benzyl-2-propylacrylate.

In the Comparative Example 4, the applicant uses the resin R_2 which is a copolymer comprising 20 mol% p-isopropenylphenol, 5 mol% methacrylic acid 25mol% 2-hydroxyethyl acrylate and 50 mol% 2-benzyl-2-propylacrylate.

In the Comparative Example 5, the applicant uses the resin R3 which is a copolymer comprising 10 mol% p-isopropenylphenol, 10 mol% methacrylic acid, 20 mol% 2-hydroxyethyl acrylate, 10 mol% isobornyl acrylate and 50 mol% 2-benzyl-2-propylacrylate.

However, there is no resin in Hamada et al. with a structure similar to any of R_1, R_2 or R_3 so the Examples and Comparative Examples in the specification of the instant application do not show that the composition of the instant application leads to unexpected results, when compared to the composition of Hamada et al.

On page 4 of the Remarks, the applicant argues the rejection of claims 23-32 under 35 USC 103(a) over Ohta et al. (US Pg-Pub 2004/0038148) in view of Aoai et al. (US Patent 6,245,485).

The applicant argues that Ohta et al. disclose a composition comprising a resin with the unit (3) of the instant application but no units of formula (1).

The examiner agrees that Ohta et al. do not specifically disclose a unit (1) but would like to point out that Ohta et al. teach that the resin (A) may comprise amido group-containing vinyl repeating units, such as acrylamide and methacrylamide (par.0043).

Aoai et al. teach that the resin comprises a group which decomposes by the action of an acid to increase the solubility in an alkali developer (column 9, lines 35-38). The resin may comprise copolymerizable monomers, such as acrylamides and methacrylamides (column 53, lines 22-27), wherein the acrylamides include N-hydroxyphenyl acrylamide (column 53, lines 59-61) and the methacrylamides include N-hydroxyphenyl methacrylamides (column 54, lines 6-7).

Aoai et al. specifically teach that monomers capable of increasing alkali solubility, such as N-(hydroxyphenyl)acrylamide and N-(hydroxyphenyl)methacrylamide are preferred (column 54, line 61 - column 55, line 2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use N-(hydroxyphenyl)acrylamide and N-(hydroxyphenyl)methacrylamide as comonomers for the resin (A) of Ohta et al., as taught by Aoai et al., in order to improve the solubility of the resin used in a positive type resist composition.

On page 4 of the Remarks, the applicant further argues that the composition of Ohta et al. does not have good plating resistance and good shape of the bottom of the plated portion, as shown by the Comparative Examples 1-5 of the instant application.

The examiner would like to point out that the resins R_1, R_2 and R_3 which are used in the Comparative Examples 1-5 do not correspond to the resins of Ohta et al. so the Examples and Comparative Examples 1-5 of the instant application do not show that the composition of the instant application leads to unexpected results, when compared to the composition of Ohta et al.

Conclusion

7. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANCA EOFF whose telephone number is (571)272-9810. The examiner can normally be reached on Monday-Friday, 6:30 AM-4:00 PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H. Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. E./
Examiner, Art Unit 1795

/Cynthia H Kelly/
Supervisory Patent Examiner, Art Unit 1795